

REMARKS

Claims 1-36 are pending in the application. Claims 2, 22, 25 and 34 have been amended herein. Favorable reconsideration of the application, as amended, is respectfully requested.

I. CLAIM OBJECTIONS

Applicant has amended claims 25 and 34 to address the informalities noted by the Examiner. Applicant respectfully requests withdrawal of the objection.

II. REJECTION OF CLAIMS 34-35 UNDER 35 USC §112, 1st ¶

Claims 34-36 are rejected under 35 U.S.C. §112, first paragraph, as failing to be enabled. The Examiner argues that claim 34 recites "a plurality of analog/digital converters". The Examiner submits that such a plurality of analog/digital converters is not discussed within the specification, and thus claim 34 is not enabled.

The present application describes the analog/digital converters primarily in the context of an analog-to-digital conversion block 21. However, as discussed in the present application at page 12, line 28 to page 13, line 18 the analog-to-digital conversion block 21 may include multiple converters either equal to the number of sense amplifiers or a reduced number (see, e.g., Figs. 7 and 8). The specification at page 13, lines 7-8 specifically refers to an arrangement in which the number of analog-to-digital converters may be less than the number of charge transfer amplifiers.

Accordingly, applicant respectfully submits that there is sufficient support in the application for "a plurality of analog/digital converters" as recited in claim 34. Withdrawal of the rejection is respectfully requested.

III. REJECTION OF CLAIMS 2 AND 30 UNDER 35 USC §112, 2nd ¶

Claims 2 and 30 stand rejected under 35 USC §112, second paragraph, as being indefinite. Applicant respectfully requests withdrawal of the rejection for at least the following reasons.

Regarding claim 2, the Examiner indicates there is insufficient antecedent basis for “the optically variable region”. In response, applicants has amended claim 2 to recite “an optically variable region” so as to provide more appropriate antecedent basis.

Regarding claim 30, the Examiner indicates that the claims do not disclose “for what length of time that the first and second sets of data lines are the same for all rows”. Frankly, applicant is uncertain why the Examiner refers to “the length of time” with respect to claim 30.

Claim 30 recites “in which said first and second ones are the same for all of the rows of said picture elements”. The “first and second ones” are in relation to claim 29 which refers to a data signal generator arranged to supply image data to “first ones” of the data lines and the output arrangement is arranged to read sensor signals simultaneously from “second ones” of the data lines different from the first ones for each row of the picture elements.

For example, Figure 6 illustrates an example of claim 30. In particular, display and sensing operations are carried out simultaneously but with each column of pixels performing sensing or display but not both. For example, the bold lines 12a are columns (“second ones”) that perform sensing and the non-bold lines are columns (“first ones”) that are performing display. Moreover, as shown in Figure 6, the “first ones” and the “second ones” are the same for all the rows.

Accordingly, it is not clear why the Examiner objects to the claims on the basis that the claims do not recite “for what length of time that the first and second sets of data lines are the same for all rows”. Time is not necessarily an element of the claimed invention in the broadest sense.

IV. REJECTIONS BASED ON TANAKA ET AL. '688

Claims 1, 5-10, 13 and 31-32 stand rejected under 35 USC §102(b) based on Tanaka et al. '688. Claim 2 stands rejected under 35 USC §103(a) based on Tanaka et al. '688 in view of Tanaka et al. ("Entry of Data and Command for an LCD by Direct Touch: An Integrated LCD Panel"; hereinafter "Tanaka-SID"). Claims 3-4 and 11-12 stand rejected under 35 USC §103(a) based on Tanaka et al. '688 in view of Tanaka-SID, and further in view of Zhang et al. Claims 14-15 stand rejected under 35 USC §103(a) based on Tanaka et al. '688 in view of Ure. Claims 16-17 and 19-21 stand rejected under 35 USC §103(a) based on Tanaka et al. '688 in view of Inoue et al. Claims 16 and 18 stand rejected under 35 USC §103(a) based on Tanaka et al. '688 in view of Yoneda et al. Claims 22-23, 25 and 27 stand rejected under 35 USC §103(a) based on Tanaka et al. '688 in view of Yoneda et al. and Ure. Claims 22 and 24-26 stand rejected under 35 USC §103(a) based on Tanaka et al. '688 in view of Yoneda et al. and Yamamoto et al. Claims 28-30 stand rejected under 35 USC §103(a) based on Tanaka et al. '688 in view of Machida et al. Claims 33-36 stand rejected under 35 USC §103(a) based on Tanaka et al. '688 in view of Nakashima et al.

Applicant respectfully requests withdrawal of each of the above-identified rejections for at least the following reasons.

Claim 1 defines an active matrix display and sensor apparatus in which each picture element has a display data input connected to a respective column data line and a scan input connected to a respective row scan line. Claim 1 further recites, *inter alia*, each picture element having an output arrangement (e.g., 19) connected to the column data lines for outputting sensor signals generated by and within the display picture elements in response to external stimuli. Tanaka et al. does not teach or suggest each picture element including such an output arrangement for outputting sensor signals generated by and within the display picture elements in response to external stimuli as claimed.

For example, the present invention enables standard display pixels to be used to sense external stimuli without requiring substantial modification. Any variation of characteristic in the pixel as a result of external stimulus is thus made accessible to the one of the sense amplifiers 20 connected to the column electrode 12 so that the characteristic resulting from the stimulus is converted to an analogue value by the sense amplifier. The characteristic sensed by the sense amplifiers may be pixel voltage, current, stored charge or capacitance or may be a combination of any of these. (See, e.g., Spec., p. 9, Ins. 1-18).

In Tanaka et al. '688, the "sensor signals" are not generated by and within each display picture element. Instead, Tanaka et al. '688 describes with respect to Fig. 3 how a photodetecting section 42 is required at the intersection of a source line 3 and a gate line 1. The photodetecting section 42 is required to detect when a beam of light is projected onto the photodetecting section 42. The resistance of the photoconductive layer 2 decreases in response to the beam of light. Then, a scan pulse having been applied to the gate line 1 is leaked and transferred into the source line 3. Specifically, such leaked signal is utilized as position information of the light pen 300.

Therefore, it is clear that in Tanaka et al. '688 the "sensor signal" is generated by and within the photodetecting section 42 due to a decrease in the resistance of the photoconductive layer 2 interposed between a source line 3 and a gate line 1 at the intersection 4. Thus, the sensor signal in Tanaka et al. '688 *is not generated by and within each display picture element* as recited in claim 1. The provision of a photoconductive layer 2 at the intersection of a source line and a gate line as taught in Tanaka et al. does not constitute generation of a sensor signal by and within the display picture element as claimed.

Accordingly, applicant respectfully submits that Tanaka et al. '688 does not teach or suggest the features of claim 1.

Additionally, the remaining claims each depend from claim 1 either directly or indirectly. These claims may be distinguished over Tanaka et al. '688 for at least the

same reasons noted above. Further, none of the secondary or tertiary references make up for the above-discussed deficiencies in Tanaka et al. '688.

Regarding claim 2 in particular, the claim recites "wherein said sensor signals are generated by and within the optically variable region of the display picture elements". The Examiner contends that it would have been obvious to replace the light pen and photosensitive intersections of Tanaka et al. '688 with the pressure detection means of Tanaka-SID. Applicants must respectfully disagree.

According to the case law set forth in Section 2143.01(VI) of the MPEP, the proposed modification or combination of the prior art cannot change the principle of operation of a reference. If the proposed modification or combination of the prior art invention would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. (See, e.g., In re Ratti, 123 USPQ 349 (CCPA 1959).

In the present case, the primary reference (Tanaka et al. '688) particularly discloses that the field of the invention relates to an information input and output apparatus comprising an active matrix drive type display device and a light pen (see, Col. 1, lines 6-11). In particular, Tanaka et al. '688 discloses an objective of providing an information input and output apparatus which does not need any electrode for detecting the position of the light pen. (See, e.g., Col. 2, Ins. 25-28). Moreover, even in the invention as claimed therein, Tanaka et al. '688 recites "a light pen for projecting light onto said display means" (Col. 7, Ins. 30-31). More importantly, Tanaka et al. '688 specifically discloses a structure of a photodetecting section 42 formed at each intersection 4 of the gate lines 1 and the source line 3 in order to detect the position of the light incident of the LCD display projected from the light pen 300. (See, e.g., Col. 3, Ins. 41-48; Col. 4, line 62 to Col. 5 line 14 and lines 36-47 of Tanaka et al. '688.

Therefore, replacing the light pen and photosensitive intersections of Tanaka et al. '688 with the pressure detection means of Tanaka-SID will clearly result in a change from the fundamental principle of operation of the invention described in Tanaka et al.

'688. Thus, one having ordinary skill in the art would not have found it obvious to modify Tanaka et al. '688 in the proposed manner as this would change the entire principle of operation of Tanaka et al. '688. The modified structure would no longer be capable of detecting the position of the light projected from the light pen, contrary to the fundamental principle of Tanaka et al. '688.

Still further, it has not been shown that one having ordinary skill in the art would even recognize how to modify Tanaka et al. '688 to include the features of Tanaka-SID and yet produce a functioning device. Tanaka et al. '688 describes circuitry for an active-matrix type display specifically for detecting light from a light pen. Tanaka-SID discloses circuitry for a passive matrix type display. There is no teaching or suggestion as to how the active-matrix structure of Tanaka et al. '688 could be modified to include the passive matrix type principles of Tanaka-SID.

Accordingly, claims 1 and 2 together with the claims dependent therefrom are both novel and non-obvious in view of Tanaka et al. '688 and Tanaka-SID. Furthermore, the various other references do not make up for the above-discussed deficiencies. Hence, applicant respectfully requests withdrawal of all of the rejections.

V. REJECTION OF CLAIM 1 BASED ON YAMADA ET AL.

Claim 1 is also rejected under 35 USC §102(b) based on Yamada et al. In particular, the Examiner contends that Yamada et al. includes an output arrangement as recited in claim 1.

The Examiner refers primarily to Figs. 13A and 13B of Yamada et al. in conjunction with Column 32, lines 30-44. Applicant notes, however, that the circuit illustrated in Fig. 13A is a circuit for a display integrated tablet of an electrostatic induction type connected to a liquid crystal display device. (See, e.g., Col. 14, Ins. 39-63). In particular, as illustrated in Fig. 13B, Yamada et al. discloses a tablet panel 90 and an LCD display 91.

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More specifically, although the invention as disclosed in Yamada et al. may be able to detect the position of a point pressed with a pen, the “sensor signal” is generated by an electrostatic coupling between the electrode of the tablet panel 90 and the electrode at the tip of the pen 93. (See, Col. 32, Ins. 30-44). Therefore, such a “sensor signal” is not generated by and within the liquid crystal display (elements) 91 (as recited in claim 1). As previously noted, the tablet panel 90 and the LCD 91 are separate and apart from each other.

In fact, Yamada et al. actually teaches away from the present invention by teaching the advantages of providing a liquid crystal display device in which the cell thickness is little varied by an external pressure. (See, e.g., Col. 6, Ins. 12-15).

Consequently, applicant also respectfully requests withdrawal of the rejection of claim 1 based on Yamada et al.

VI. CONCLUSION

Accordingly, all claims 1-36 are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

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Should a petition for an extension of time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional extension is necessary), petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988.

Respectfully submitted,

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